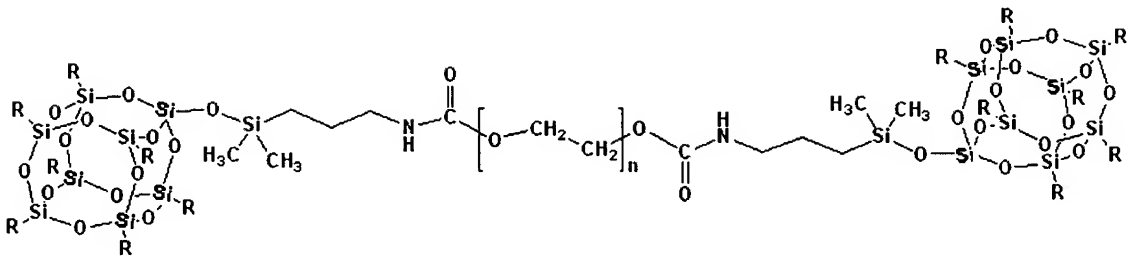
WE CLAIM:

1. An amphiphilic telechelic incorporating POSS having the following structure



wherein R is a cyclic hydrocarbon selected from the group of cyclohexyl, cyclopentyl, cyclooctyl, methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, styryl, vinyl, allyl, ethylphenyl ($CH_2C_6H_5$), or an aryl group selected from the group of phenyl, biphenyl, naphthyl.

2. An amphiphilic telechelic incorporating POSS according to claim 1 wherein R is cyclohexyl.

3. An amphiphilic telechelic incorporating POSS according to claim 1 wherein n is 1 to 23,000.

4. An amphiphilic telechelic incorporating POSS according to claim 1 having a POSS content from about 19.0 to about 70.0 wt%.

5. An amphiphilic telechelic incorporating POSS according to claim 1 having molecular weight of about 3300 to 13,000 g/mol.

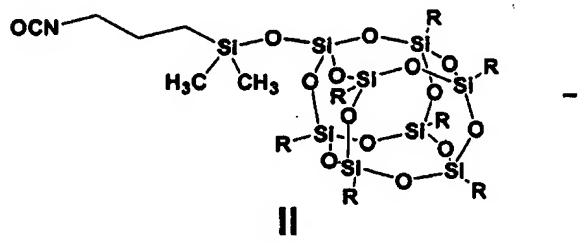
6. A method for forming amphiphilic telechelics incorporating POSS which comprises reacting polyethylene glycol homopolymer and POSS macromer wherein the monoisocyanate groups of two of said POSS macromers are directly linked between the diol end groups of said polyethylene glycol homopolymer.

7. A method according to claim 6 wherein said reaction is carried out in the presence of dibutyl tin dilaurate as catalyst.

8. A method according to claim 5 wherein said polyethylene glycol has a molecular weight of about 62 - 1,000,000 g/mol.

9. A method according to claim 6 wherein said polyethylene glycol has a molecular weight of about 100 to 10,000 g/mol.

10. A method according to claim 6 wherein said POSS macromer has the formula



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wherein R is an unreactive aliphatic group.

11. A method according to claim 6 wherein said POSS macromer is isocyanatodimethylsilylcyclohexyl -POSS.

12. A method according to claim 6 wherein said polyethylene glycol has a molecular weight of about 62 – 1,000,000 g/mol and said POSS macromer is isocyanatodimethylsilylcyclohexyl–POSS.

13. A method according to claim 6 wherein the ratio of polyethylene glycol to POSS macromer used in the reaction is about 1:1.8-2.20.

14. A method according to claim 6 which comprises introducing the POSS macromer into the reaction in an amount to provide about 19.0 to about 70.0 wt% of POSS macromer in the amphiphilic telechelic produced.

15. An amphiphilic telechelic made by the method of claim 6.

16. An amphiphilic telechelic made by the method of claim 11.

17. A nonionic surfactant characterized by enhanced thickening behavior comprising an amphiphilic telechelic according to claim 1.

18. A toughening additive for polymers selected from the group consisting of epoxy, polymethylmethacrylate, polyvinylacetate, polyethylmethacrylate, sulfonated styrene and polysulfone comprising an amphiphilic telechelic according to claim 1.

19. A solid polymer electrolyte, consisting of an amphiphilic telechelic according to claim 1 or a blend of such amphiphilic telechelic with unmodified PEGs, with high ionic conductivity for battery applications.

20. A method of preparing a shape memory polymer which comprises reacting a polyol, a diosocyanate, and a chain extender selected from the group consisting of TMP cyclopentyldiol-POSS, TMP cyclohexyldiol-POSS, TMP isobutydiol-POSS, transcyclohexanediolcyclohexane-POSS and transcyclohexanediolisobutyl-POSS.

21. A shape memory polymer produced by the method of claim 20.